

Remarks

The final Office Action dated November 25, 2011, presents the following claim rejections: claims 1, 4-7, 9-10, 12-19 and 21 stand rejected under 35 U.S.C. § 103(a) over Omura *et al.* (EP 1168455) in view of Peake *et al.* (U.S. Patent Pub. No. 2005/0173758); claims 2 and 11 stand rejected under 35 U.S.C. § 103(a) over the '455 reference in view of the '758 reference and further in view of Onda *et al.* ("SIC Integrated MOSFETs" Physica Status Solidi (A), Applied Research, Berlin, DE, vol.162, no. 1, 16 July 1997, pages 369-388); claims 3 and 20 stand rejected under 35 U.S.C. § 103(a) over the '455 reference in view of the '758 reference and further in view of Miyano *et al.* (JP 403211885A); and claim 8 stands rejected under 35 U.S.C. § 103(a) over the '455 reference in view of the '758 reference and further in view of Hshieh *et al.* (U.S. Patent Pub. No. 2001/0003367). In the following discussion, Applicant traverses the objections and rejections, and does not acquiesce to any rejection or averment in this Office Action.

Applicant maintains its traverses of all rejections under 35 U.S.C. § 103(a) because the '455 reference does not describe, suggest, or teach that modifications to a doping gradient would produce a desired result. According to the M.P.E.P. and relevant case law (presented in further detail below), a parameter must be recognized as a "result-effective variable" before that variable might be characterized as subject to routine experimentation. That is to say that a parameter (such as a doping gradient), must 1) be recognized as being modifiable and 2) the modification must be recognized as producing a certain result which would thereby lead to the specific value in the claim limitations. The Examiner does not provide a single statement linking modifications to doping gradient with a desired result. Accordingly, the Examiner has not met the two requirements of the M.P.E.P. At best, the Examiner opines that certain modifications *might* have a tangential effect on a doping gradient.

The '455 reference has not been shown to recognize that a doping gradient is a results-effective variable. The Examiner relies exclusively upon descriptions relating to increases in doping concentration in a drift region, but uniform increases in doping concentration would not change the doping gradient. In the Final Office Action, the Examiner has not refuted that the '455 reference does not recognize altering the doping gradient of a drift region. Rather, the Examiner states that gradient would be determined

by the doping concentration in “various regions.” Page 15 of the Final Office Action. The Examiner provides little further explanation and no reference to teachings from the ‘455 reference that might explain what these “various regions” would have been understood as being. Applicant maintains that the ‘455 reference describes increasing the doping concentration to reduce the ON-voltage, but does not recognize experimentation with the doping gradient. Without recognizing the doping gradient as a “results-effective variable,” the doping gradient would not be subject to routine experimentation as the Examiner alleges.

According to M.P.E.P. § 2144.05(b), “A particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation. *In re Antonie*, 559 F.2d 618, 195 USPQ 6 (CCPA 1977) (The claimed wastewater treatment device had a tank volume to contractor area of 0.12 gal./sq. ft. The prior art did not recognize that treatment capacity is a function of the tank volume to contractor ratio, and therefore the parameter optimized was not recognized in the art to be a result-effective variable.). *See also In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980) (prior art suggested proportional balancing to achieve desired results in the formation of an alloy).”

Nothing in the ‘455 reference would suggest to one skilled in the art that a doping gradient of a drift region should be increased. The ‘455 reference recognizes, and discusses in detail, that increasing the doping concentration in the drift region would reduce the ON-resistance of the device. As previously described, as relating to the ON-resistance, the ‘455 reference does not discuss increasing or even changing the doping concentration in order to reduce the ON-resistance of the device. The ‘455 reference makes reference to doping gradient in the drift region which appears to relate to a showing that the gradient can increase towards the substrate, however, the reference itself does not discuss whether the doping gradient relates to reducing the ON-resistance. The ‘455 reference does mention another possible method of reducing the ON-resistance, without describing the doping gradient. For example, the ‘455 reference states, “thickness of the first insulating film 16 on the surface of the buried electrode 17 may be increased toward the substrate 11 instead of changing the impurity concentration of the

drift layer 12 in the above manner. In this case as well, the same effects as described above can be obtained.” Para. 0056. The ‘455 reference describes increasing the thickness of the insulating film and the impurity concentration of the drift layer as possible alterations. The doping gradient is not mentioned. Because the ‘455 reference does not mention increasing the doping gradient in the drift region to reduce the ON-resistance, the reference does not recognize doping gradient as a result-effective variable.

Experimentation with different levels of total doping concentration is not equivalent to experimentation with a doping gradient, and therefore, the doping gradient has not been recognized as a results-effective variable. *See e.g. Ex parte Microchip Technology, Inc.*, Board of Patent Appeals and Interferences, Appeal 2009-015199, August 11, 2010, p. 11 (Overturning a rejection because the examiner alleged routine experimentation relating to “the number of pins,” but did not show that the number of pins was “a parameter subject to optimization.”). Applicant therefore submits that because neither the ‘455 reference nor the Examiner recognize that the doping concentration gradient is a results-effective variable, one skilled in the art would not experiment with the doping gradient. Therefore, the 50 times gradient difference in the claimed invention would not have been an obvious goal/result of experimentation, and the § 103(a) rejection of claims 1-21 is improper, and should be removed.

Applicant additionally maintains the traversal of the 35 U.S.C. § 103(a) rejection of claims 1-21 because the cited references teach away from the Office Action’s proposed combination. In considering the Applicant’s previous traversals of record, the Examiner applies the wrong standard in considering whether the prior art references teach away from the proposed combination. Rather than considering the evidence of teaching away presented by the Applicant, the Examiner states that a reference does not teach away unless it expressly precludes the proposed modification. Page 17 of the Final Office Action. While an express preclusion would also show the improper nature of the proposed modifications, the Examiner cannot ignore the substantive teaching of the references simply because they do not state that a certain modification is impossible. This is not, and has never been, the standard for teaching away. The undisputed fact are 1) ‘455 reference explicitly states that the first insulating film (*i.e.*, the alleged field plate insulator) is thicker than the second insulting film (*i.e.*, the alleged gate-field

plate insulator), 2) the '455 reference teaches that these thicknesses are desirable, and 3) the only specific embodiments disclosure in '455 reference have *at least* seven times greater thickness in the wrong orientation relative to the claim limitations. The Examiner ignores all of these facts for no reason other than the '455 reference does not expressly exclude all other hypothetical embodiments. The Examiner does not provide any citation to the M.P.E.P. or to case law that states teaching away must expressly exclude all hypothetical embodiments. The Examiner's failure to consider the evidence of record is improper and the rejections should be reversed.

Moreover, the Examiner's conclusion in refuting that the '455 reference teaches away both lacks any support in the reference, and is not explicitly mentioned therein. The '455 reference does not state that the "thickness of the gate-field plate insulator can be greater than or equal to the thickness of the filed [sic] plate insulator using the method shown in the '455 (paragraph [0031])". Page 17 of the Final Office Action. Contrary to the Examiner's conclusion, potentially equal dimensions are not discussed in the cited portion of the '455 reference. As stated previously, the respective thickness of the first insulating film and the second insulating film are taught to be between *seven to seventy-five times* different in the paragraph cited by the Examiner. There is no mention that these two thicknesses would even approach the same value. The Examiner's belief in this regard is unfounded, and unsupported by the '455 reference. The '455 reference explicitly states that the first insulating film (*i.e.*, the alleged field plate insulator) is thicker than the second insulting film (*i.e.*, the alleged gate-field plate insulator), and does not suggest that they could be equal. Therefore, the primary '455 reference teaches away from the alleged modification in view of the secondary '758 reference. Under M.P.E.P. § 2143.01, the rejections cannot be maintained.

Further, the Applicant maintains that the Examiner fails to provide proper motivation for the asserted modification. Under M.P.E.P. § 2143.01, "obviousness can be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so." The Examiner asserts that "a relative thick insulating layer is needed between the field plate and the gate" in order to withstand the bias potential. Page 17 of the Final Office Action. This bias potential is not mentioned in the '455 reference. The reasoning to modify the

primary '455 reference with the secondary '758 reference would be to withstand a bias potential, a problem identified not shown to be present in the '455 reference.

In view of the remarks above, Applicant believes that each of the rejections has been overcome and the application is in condition for allowance. Should there be any remaining issues that could be readily addressed over the telephone, the Examiner is asked to contact the agent overseeing the application file, Peter Zawilski, of NXP Corporation at (408) 518-5540 (or the undersigned).

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